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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ivan Engmark Mortensen

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EXAMINER

PENG, CHARLIE YU

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,547	Applicant(s) MORTENSEN ET AL.	
	Examiner CHARLIE PENG	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-23 is/are rejected.
- 7) ☒ Claim(s) 1-4, 7-11, 13-19 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/19/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of: Group I - Specie A as shown in Fig. 1, Group II - Specie C as shown in Fig. 5, and Group III - Specie E as shown in Fig. 8, on 10 April 2009 is acknowledged. The election is made **without** traverse.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Denmark on 23 January 2004. It is noted, however, that applicant has not filed a certified copy of the PA-2004-00093 application as required by 35 U.S.C. 119(b).

Claim Objections

4. Claim 1 is objected to because of the following informalities: there are two instances of "a number of reflecting structures" on lines 5 and 13, the second of which should clearly refer back to the first, *or* they should be separated designated as different components of the claimed invention. Appropriate correction is required.

5. Claims 1-4, 7, 9-11, 13-19 and 21 are objected to because of the following informalities: there are multiple instances of "at least one optical fibre", "said optical fibre", "the optical fibre", "the fibre", etc. in the claims listed, the later instances should refer back to the first consistently, *or* they should be separated designated as different components in order to clarify the claimed invention. Appropriate correction is required.

6. Claim 2 is objected to because of the following informalities: there are two instances of "one connecting means" on line 2, they should be separated designated as different components of the claimed invention. Appropriate correction is required.

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7. Claim 16 is objected to because of the following informalities: claim 16 depends on any one of claims 1-15 and recites limitations such as “at least one optical fibre” but should recite “*the* at least one optical fibre” since each of claims 1-15 already contains this limitation. Similar objections are made to “connecting means”, “light emitting means”, etc. Appropriate correction is required.

8. Claim 18 is objected to because of the following informalities: claim 18 depends on claim 1 and recites limitations such as “a device” but should recite “*the* device” since claim 1 already contains this limitation. Similar objections are made to “light emitting means”, “light receiving means”, “an optical fibre”, “at least one loop”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 18 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase “and/or” is inherently indefinite since it fails to make clear whether subject matters should be considered in combination or in alternate.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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12. Claims 1-7, 11 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,586,772 to Kenny et al. in view of U.S. Patent 6,547,448 to Johnson et al. Kenny teaches a strain sensor with optical fiber Bragg gratings in an encapsulating material 9 comprising:

an optical fiber loop having a number of reflecting structures/FBG 1A, 1B, 1C;

an enclosing structure 71 holding and encapsulating a fiber loop B within a pocket of gas so the fiber may substantially freely change length when subject to a change in temperature, i.e. without making contact with the encapsulating material 9; (See at least Fig. 14 and description)

wherein the sensors can be used as surface attached sensors, or as sensors embedded into structures and components made of composite materials, e.g. carbon fibre reinforced composites or cement based materials. (Col. 11, lines 12-16)

Kenny does not specify how an external light source 70 (which outputs a signal 80 to the FBGs) and an external light detector 71 (which receives a reflected signal 81) are connected to the fiber input and output portions 50, 52 or particular structures of the connection means. Johnson teaches an fiber optic connector 10, which is embeddable within a composite structure 11 (e.g. fibrous tow pre-impregnated with thermoset or thermoplastic resin), wherein an internal connector ferrule 14 mounted on an internal/embedded optical fiber 16 and connected to a diagnostic sensor 20, an external connector ferrule 15 mounted on an external connector ferrule 15, a sheath 12 and an alignment sleeve 13 combine to ensure proper alignment of the internal and external fibers 15, 17. Since both inventions use optical fiber sensors embedded in a composite material, it would have been obvious to one having ordinary skill in the art to modify Kenny's invention by using the fiber optical connector as suggested by Johnson since it allows

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simple disconnection and reconnection yet reliable alignment.

It is noted that the “adapted for” clause throughout the claim (i.e., at least one system *adapted for* use in temperature compensation for strain measurements) does not require the system to measure strain. Rather the subject limitation only requires that it could, if desired, to be used in temperature compensation for strain measurements, although “(f)ibre Bragg gratings are well known and can be used as temperature sensors or strain gauges as alternatives to electrical sensors, providing numerous advantages”. (col. 1, lines 41-43) Claim scope is not limited by claim language that does not limit a claim to a particular structure. If it is not desired, then it is not required. Consequently, the subject “adapted for” limitation is not considered to be further limiting, and it may or may not be considered in examining the claims. (See MPEP 2111.04)

13. With specific reference to claim 3, Kenny teaches an embodiment (Fig. 17) that suggests multiple encapsulating voids 101 at different locations of the encapsulating material 9.

14. With specific reference to claim 6, the connections means as suggested by Johnson are placed by a surface 19.

15. With specific reference to claim 7, the sheath 12 and/or alignment sleeve 13 can be considered support means.

16. With specific reference to claim 11, Kenny teaches that the FBGs can be each glued between opposing plates P_T , P_B .

17. With specific reference to claims 5, 18 and 19, the sheath 12 can be considered a housing and the alignment sleeve 13 can be considered the elongated resilient portion.

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18. With specific reference to claims 21 and 22, the enclosing structure 71 has two circular recesses for receiving fiber portion 50 entering and exiting the structure 71.

19. With specific reference to claims 20 and 23, Kenny and Johnson teach the connection and holding means but not their specific shapes, e.g. substantially frusto-conical or truncated pyramid as claimed. Such a modification, however, would have been obvious since a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed connection and holding means was significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) The rejection may be overcome by a showing of unexpected results.

20. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenny et al. and Johnson et al. as applied to claim 1 above, and further in view of U.S. Patent 6,940,186 to Weitkamp. Kenny and Johnson teach the optical fiber sensor assembly in a fiber composite as claimed but not using the sensor assembly on a wind turbine rotor blades. Weitkamp teaches using two chains 110 of sensor elements realized by fibre grating technology placed on opposite sides of a rotor blade. It therefore would have been obvious to one having ordinary skill in the art in order to determine information such as wind speed distribution, loads on individual rotor blades and incorporate such information into the adjustment or control of operation parameters.

21. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenny et al. and Johnson et al., and further in view of China Patent Publication CN-1303009 to Hang et al. Kenny and Johnson teach the method for manufacturing the claimed sensor device as described in rejection to claim 1 above but not using a molding means as claimed. Hang teaches braiding optical-fibre sensor in the composite braided material and a method for testing its property

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feature that a resin-transfer moulding-formation process mould composed of top cover, moulding cavity and bottom is used to braid dot-type or distributed optical fibre sensor in the composite braided material; or braiding the optical fibre sensor in one layer of material or several layers of material. The technological procedure of braiding the composite material can be monitored and the parameters of the composite material can be tested, resulting in more correct and reliable analysis to mechanical performance and damage condition. It therefore would have been obvious for one having ordinary skill in the art to embed the optical fiber sensor by Kenny and Johnson in the composite material using the moulding-formation process suggested by Hang et al. for the same purposes provided.

22. With specific reference to claims 14, 15 and 17, official notice is taken of the fact that optical fibers or cables are typically stored on a spool prior to using to maintain a minimum radius of curvature and not damage the optical fibers and this claimed modification clearly is not novel or patentable to one having ordinary skill in the art.

Allowable Subject Matter

23. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The claimed subject matter of a string comprising woven or braided fibers as part of the supporting means is not a reasonable modification in view of the structure described by Kenny et al.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHARLIE PENG whose telephone number is (571)272-2177. The examiner can normally be reached on 9 am - 6 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

06/19/2009

/CHARLIE PENG/
Primary Examiner, Art Unit 2883